What is claimed:

1. A method of evaluating a diffracting structure formed on a semiconductor sample comprising the steps of:

creating a database, said database including interpolation points and associated theoretical optical response characteristics, each interpolation point corresponding to a sample parameter set and with the associated theoretical optical response characteristics being determined by applying a sample model to each of the parameter sets;

measuring the actual optical response characteristics of the sample; and

iteratively interpolating between the interpolation points using an interpolation model that defines a substantially continuous function which intersects with the interpolation points in order to derive a set of interpolated optical response characteristics that best fit the actual optical response characteristics to evaluate the sample.

2. A method as recited in claim 1, wherein the optical response characteristics are in the form of one or both of complex reflectance coefficients and scattering matrices.

3. A method as recited in claim 1, wherein said optical response characteristics are created and measured as a function of wavelength.

4. A method as recited in claim 1, wherein said interpolation model utilizes one or more of linear, multi-cubic, and quadratic functions.

5. A method of evaluating parameters of a diffracting structure formed on semiconductor samples comprising the steps of:

calculating optical response characteristics for selected parameter sets, each set of parameters corresponding to an interpolation point;

defining a continuous model of the optical responses as a function of the parameters that equals the optical responses at the interpolation points;

measuring an optical signal of a sample; and

evaluating the parameters of the sample by iteratively fitting the optical signal with the interpolation model.

6. A method as recited in claim 5, wherein the calculating comprises calculating one or both the complex reflectance coefficients and scattering matrices.

7. A method as recited in claim 5, wherein said optical signals are measured as a function of wavelength.

8. A method as recited in claim 5, wherein said measuring step comprises measuring reflectance of the sample.

9. A method as recited in claim 5, wherein said interpolation model comprises one or more of linear, multi-cubic, or quadratic functions.

10. A method as recited in claim 5, wherein fitting comprises calculating a theoretical optical signal from the model.